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EXAMINER				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/539,132  
Filing Date: June 16, 2005  
Appellant(s): SCHULTES ET AL.

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Harris A. Pittick  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 10/28/2009 appealing from the Office action mailed 5/26/2009.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4,180,529	Hofmann	04-1990
4,173,596	De Witt	11-1979
4,914,142	Takarabe et al	04-1990
4,371,677	Morningstar et al	02-1983
4,542,179	Falk et al	09-1985
5,777,034	Shah et al	07-1998

**(9) Grounds of Rejection**

Upon further consideration the following rejections are withdrawn as being cumulative.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Takarabe et al (US 4, 914, 142) as applied to claim 30 above, and further in view of Falk et al (US 4, 542, 179).

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Takarabe et al (US 4, 914, 142) as applied to claim 30 above, and further in view of Shah et al (US 5, 777, 034).

The following ground(s) of rejection are maintained as being applicable to the appealed claims:

Claims 18, 20-23, 25-31 and 34-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of DeWitt (US 4, 173, 596).

Hofmann discloses a multistage, sequential process for making an acrylic graft copolymer. Upon blending with a non-resilient methacrylic matrix resin, followed by molding, an impact resistant molded product is obtained (abstract).

See example 8 for the process of making a four stage resin, where initial charge comprises 20,000 g of water and 3.6 g of SDOSS (sodium dioctyl sulfosuccinate) an emulsifier (read on wt% of emulsifier and water in claim 20). The proportion of monomers in stage 2 (2820 g MMA, 180 g EA and 12 g ALMA), stage 3 (4863 g BA, 1110 g S, and 110 g ALMA), and stage 4 (2256 g MMA and 144 g EA) read on the proportions of monomers in stage 1, 2 and 3 respectively of claim 18.  $K_2S_2O_8$  i.e. potassium peroxodisulphate (KPS) in demineralized water was added to initiate polymerization reaction. The monomer mixture in stages 3 and 4 (equivalent of stages 2 and 3 of present claims) is metered in over a period of several minutes. The first stage is used as a seed or core around which either more of the first stage or subsequent stages are polymerized in layers (column 2, lines 57-60).

Generally, the final particle size should be preferably between about 0.15 to 0.35 microns i.e. 150 to 250 nm (column 2, line 68, column 3, line 1). A blend of 20 lbs. of graft polymer (i.e. core-shell polymer particle) and 30 lbs. of Lucite® 47F (MMA/EA; 94/6) was prepared and the blend was extruded in a twin screw extruder (column 10, lines 18-20).

Hofmann differs with respect to initial charge which is an emulsion of a seed latex whose particle radius is 3.0 to 20 nm; total weight of components A-J, based on total

weight of aqueous dispersion; properties of molded product and amount of coagulate in the dispersion.

However, DeWitt teaches improved impact modifiers prepared by emulsion polymerization in the presence of seed latex (column 2, lines 66-68). Latex is initially provided wherein polymer particles are dispersed in an aqueous medium. These polymer particles have an average size range of from about 200 to about 2,000 Å units (column 3, lines 59-62) i.e. 20 to 200 nm. Therefore, it would have been obvious to continue the polymerization of first stage, in Hofmann, until a seed polymer with a particle size of 20 nm to 200 nm (i.e. radius of 10 nm to 100 nm) is obtained because DeWitt teaches using seed latex having a particle size of 20 to 200 nm to obtain a core-shell polymer particle that provides improved impact strength.

With respect to the total weight of components A-J, proportion of monomers in examples of Hofmann read on the proportion of components A-J of instant invention. The amount of solvent i.e. water used to form emulsion or dispersion is within the scope of a skilled artisan and can be varied depending on the desired solids content and end use requirements, absent evidence of unexpected results.

With respect to the properties of molded product and amount of coagulate in the dispersion, given that prior art teaches / discloses essentially the same molding composition and aqueous dispersion is made by a substantially similar process as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that the molding composition of prior art would exhibit essentially the same properties under similar test conditions and aqueous dispersion would contain 0.1% or less by weight of coagulate. Since PTO cannot conduct experiments, the burden of proof is

shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

Claims 18, 20-21, 25-31 and 34-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Takarabe et al (US 4, 914, 142).

Hofmann discloses a multistage, sequential process for making an acrylic graft copolymer. Upon blending with a non-resilient methacrylic matrix resin, followed by molding, an impact resistant molded product is obtained (abstract).

See example 8 for the process of making a four stage resin, where initial charge comprises 20,000 g of water and 3.6 g of SDOSS (sodium dioctyl sulfosuccinate) an emulsifier (read on wt% of emulsifier and water in claim 20). The proportion of monomers in stage 2 (2820 g MMA, 180 g EA and 12 g ALMA), stage 3 (4863 g BA, 1110 g S, and 110 g ALMA), and stage 4 (2256 g MMA and 144 g EA) read on the proportions of monomers in stage 1, 2 and 3 respectively of claim 18.  $K_2S_2O_8$  i.e. potassium peroxodisulphate (KPS) in demineralized water was added to initiate polymerization reaction. The monomer mixture in stages 3 and 4 (equivalent of stages 2 and 3 of present claims) is metered in over a period of several minutes. The first stage is used as a seed or core around which either more of the first stage or subsequent stages are polymerized in layers (column 2, lines 57-60).

Generally, the final particle size should be preferably between about 0.15 to 0.35 microns i.e. 150 to 250 nm (column 2, line 68, column 3, line 1). A blend of 20 lbs. of graft polymer (i.e. core-shell polymer particle) and 30 lbs. of Lucite® 47F (MMA/EA; 94/6) was prepared and the blend was extruded in a twin screw extruder (column 10, lines 18-20).

Hofmann is silent with respect to initial charge of an aqueous emulsion of a long chain alcohol; total weight of components A-J, based on the total weight of aqueous dispersion; properties of molded product, and amount of coagulate in the dispersion.

However, Takarabe et al teach a method by which a highly monodisperse emulsion polymer can be produced while the occurrence of a coagulum or new particles during the polymerization is inhibited to a low level (column 2, lines 30-36). The object is achieved by adding a polymerizable monomer to an emulsion polymer containing a high-molecular weight compound as a seed polymer and thereafter, polymerizing the monomer in presence of a film forming aid (column 2, lines 37-46). Typical examples of the film-forming aid include ethylene glycol, isopropyl benzyl alcohol and alkyl-substituted glycols having 3 to 8 carbon atoms (column 3, lines 24-46). Therefore, it would have been obvious at the time invention was made to add film forming aid such as alcohol to the initial charge of Hofmann to obtain a highly monodisperse emulsion comprising core-shell polymer particle while maintaining coagulum or new particle formation at a low level.

With respect to total weight of components A-J, the proportion of monomers in examples of Hofmann read on the proportion of components A-J of instant invention. The amount of solvent i.e. water used to form emulsion or dispersion is within the scope of a skilled artisan and can be varied depending on the desired solids content and end use requirements, absent evidence of unexpected results.

With respect to the properties of molded product, given that prior art teaches / discloses essentially the same molding composition and is made by a substantially similar process as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that the molding composition of prior art would exhibit



essentially the same properties under similar test conditions. Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

With respect to the amount of coagulum in aqueous dispersion, given that Hofmann teaches a substantially similar process for forming an aqueous dispersion and Takarabe et al teach polymerizing monomers in the presence of film forming aids such as ethylene glycol, isopropyl benzyl alcohol and alkyl-substituted glycols to obtain dispersions with low level of coagulum, one of ordinary skill in the art would have a reasonable basis to believe that the aqueous dispersion of Hofmann in view of Takarabe et al would have coagulum content of 0.1% or less by weight. Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

Claims 18, 20-21, 24-31 and 34-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Morningstar et al (US 4, 371, 677).

Hofmann discloses a multistage, sequential process for making an acrylic graft copolymer. Upon blending with a non-resilient methacrylic matrix resin, followed by molding, an impact resistant molded product is obtained (abstract).

See example 8 for the process of making a four stage resin, where initial charge comprises 20,000 g of water and 3.6 g of SDOSS (sodium dioctyl sulfosuccinate) an emulsifier (read on wt% of emulsifier and water in claim 20). The proportion of

monomers in stage 2 (2820 g MMA, 180 g EA and 12 g ALMA), stage 3 (4863 g BA, 1110 g S, and 110 g ALMA), and stage 4 (2256 g MMA and 144 g EA) read on the proportions of monomers in stage 1, 2 and 3 respectively of claim 18.  $K_2S_2O_8$  i.e. potassium peroxodisulphate (KPS) in demineralized water was added to initiate polymerization reaction. The monomer mixture in stages 3 and 4 (equivalent of stages 2 and 3 of present claims) is metered in over a period of several minutes. The first stage is used as a seed or core around which either more of the first stage or subsequent stages are polymerized in layers (column 2, lines 57-60).

Generally, the final particle size should be preferably between about 0.15 to 0.35 microns i.e. 150 to 250 nm (column 2, line 68, column 3, line 1). A blend of 20 lbs. of graft polymer (i.e. core-shell polymer particle) and 30 lbs. of Lucite® 47F (MMA/EA; 94/6) was prepared and the blend was extruded in a twin screw extruder (column 10, lines 18-20).

Hofmann is silent with respect to initial charge of an aqueous emulsion of a long chain alcohol; total weight of components A-J, based on total weight of aqueous dispersion; properties of molded product; amount of coagulate in the dispersion.

However, Morningstar et al disclose a process for making dispersion copolymers (abstract). The addition of long straight chain saturated alcohol, containing from 8 to 24 carbon atoms, in the emulsifier system increases colloidal stability of the polymerization and reduces the amount of coagulum in the copolymer latex. Examples of such alcohols include dodecanol, tridecanol, tetradecanol, docosanol etc. (column 3, lines 28-40). Therefore, it would have been obvious to add long straight chain saturated alcohol containing from 12 to 22 carbon atoms to the initial charge of Hofmann for reducing the amount of coagulum in the copolymer latex.

With respect to total weight of components A-J, the proportion of monomers in examples of Hofmann read on the proportion of components A-J of instant invention. The amount of solvent i.e. water used to form emulsion or dispersion is within the scope of a skilled artisan and can be varied depending on the desired solids content and end use requirements, absent evidence of unexpected results.

With respect to the properties of molded product, given that prior art teaches / discloses essentially the same molding composition and is made by a substantially similar process as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that the molding composition of prior art would exhibit essentially the same properties under similar test conditions. Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

With respect to the amount of coagulum in aqueous dispersion, given that Hofmann teaches a substantially similar process for forming an aqueous dispersion and Morningstar et al teach that addition of long straight chain saturated alcohol, containing from 8 to 24 carbon atoms, in the emulsifier system increases colloidal stability of polymerization and reduces the amount of coagulum in copolymer latex, one of ordinary skill in the art would have a reasonable basis to believe that aqueous dispersion of Hofmann in view of Morningstar et al would have coagulum content of 0.1% or less by weight. Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of DeWitt (US 4, 173, 596) as applied to claim 30 above, and further in view of Falk et al (US 4, 542, 179).

The discussion with respect to Hofmann in view of DeWitt in paragraph 3 above is incorporated here by reference.

Hofmann in view of DeWitt is silent with respect to the use of styrene-acrylonitrile in the molding composition.

However, Falk et al teach that addition of styrene-acrylonitrile copolymer to acrylic core-shell polymers reduces mold shrinkage and improves surface hardness. The styrene-acrylonitrile copolymer resins useful in the practice of this invention are copolymers of styrene and acrylonitrile comprising from 50 to 90% by weight of styrene and 10 to 50% by weight of acrylonitrile. Therefore, it would have been obvious to one skilled in the art at the time invention was made to add styrene-acrylonitrile copolymers to the molding composition containing core-shell polymers of Hofmann in view of DeWitt, and obtain a mold with reduced shrinkage and improved surface hardness.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of DeWitt (US 4, 173, 596) as applied to claim 30 above, and further in view of Shah et al (US 5, 777, 034).

The discussion with respect to Hofmann in view of DeWitt in paragraph 3 above is incorporated here by reference.

Hofmann in view of DeWitt is silent with respect to the molding composition comprising 0.1 to 10.0% by weight of another polymer with a molecular weight higher by at least 10% than that of (meth)acrylic polymer.

However, Shah et al teach a methacrylate resin blend composition having improved solvent craze resistance. The improvement is achieved in a simple way while retaining the blend composition's desirable properties such as weather resistance, molding, impact resistance and mechanical properties (column 1, lines 1-10). The blend composition contains a methacrylate matrix resin, particles of a single layer polymer and optionally an acrylic multi-layer polymer. The particles of a single layer polymer have a weight average molecular weight of at least 120% of the  $M_w$  of the methacrylate matrix resin component (abstract). The simple incorporation of SLP's (single layer polymer) into the methacrylate matrix resin provides the improvement in craze resistance (column 4, line 67; column 5, lines 1-3). The matrix resin will comprise 50 to 90 wt%, the impact modifier resin from 0 to 50 wt% and the single layer polymer from 1 to 50 wt% of the blend composition (column 6, lines 42-45). Therefore, it would have been obvious to one skilled in the art at the time invention was made to add a polymer having a molecular weight of at least 120% of the  $M_w$  of methacrylate resin of Hofmann in view of DeWitt, in an amount of from 1 to 50 wt% and obtain a molding composition that will exhibit improved solvent craze resistance.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Momingstar et al (US 4, 371, 677) as applied to claim 30 above, and further in view of Falk et al (US 4, 542, 179).

The discussion with respect to Hofmann in view of Morningstar et al in paragraph 5 above is incorporated here by reference.

Hofmann in view of Morningstar et al is silent with respect to the use of styrene-acrylonitrile in the molding composition.

However, Falk et al teach that addition of styrene-acrylonitrile copolymer to acrylic core-shell polymers reduces mold shrinkage and improves surface hardness. The styrene-acrylonitrile copolymer resins useful in the practice of this invention are copolymers of styrene and acrylonitrile comprising from 50 to 90% by weight of styrene and 10 to 50% by weight of acrylonitrile. Therefore, it would have been obvious to one skilled in the art at the time invention was made to add styrene-acrylonitrile copolymers to the molding composition containing core-shell polymers of Hofmann in view of Morningstar et al, and obtain a mold with reduced shrinkage and improved surface hardness.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Morningstar et al (US 4, 371, 677) as applied to claim 30 above, and further in view of Shah et al (US 5, 777, 034).

The discussion with respect to Hofmann in view of Morningstar et al in paragraph 5 above is incorporated here by reference.

Hofmann in view of Morningstar et al is silent with respect to the molding composition comprising 0.1 to 10.0% by weight of another polymer with a molecular weight higher by at least 10% than that of (meth)acrylic polymer.

However, Shah et al teach a methacrylate resin blend composition having improved solvent craze resistance. The improvement is achieved in a simple way while

retaining the blend composition's desirable properties such as weather resistance, molding, impact resistance and mechanical properties (column 1, lines 1-10). The blend composition contains a methacrylate matrix resin, particles of a single layer polymer and optionally an acrylic multi-layer polymer. The particles of a single layer polymer have a weight average molecular weight of at least 120% of the  $M_w$  of the methacrylate matrix resin component (abstract). The simple incorporation of SLP's (single layer polymer) into the methacrylate matrix resin provides the improvement in craze resistance (column 4, line 67; column 5, lines 1-3). The matrix resin will comprise 50 to 90 wt%, the impact modifier resin from 0 to 50 wt% and the single layer polymer from 1 to 50 wt% of the blend composition (column 6, lines 42-45). Therefore, it would have been obvious to one skilled in the art at the time invention was made to add a polymer having a molecular weight of at least 120% of the  $M_w$  of methacrylate resin of Hofmann in view of Morningstar et al, in an amount of from 1 to 50 wt% and obtain a molding composition that will exhibit improved solvent craze resistance.

#### **(10) Response to Argument**

Appellants argue that, any attempt to achieve a solids content higher than 48% by weight resulted in observation of an increased amount of coagulate (i.e. > 1% by weight of the dispersion). The prior art compared is closer to the presently claimed invention than Hofmann or any of the other prior art applied herein.

In response, firstly, comparative data is not with the cited prior art of Hofmann. Secondly, comparative data (i.e. VB1 and VB2) uses a reaction temperature of 52°C (i.e.

outside the instantly claimed range of 60 to 90°C and that taught in the cited prior art of Hofmann, which is 80°C).

Appellants argue that, there is no description, either in Hofmann or DeWitt, of a core/shell structured polymer product that is produced from a dispersion that has a coagulation content of any amount.

In response, given that the process limitations are met by the combined teachings of Hofmann and DeWitt, it is the examiner's position that dispersion of Hofmann in view of DeWitt would have the instantly claimed coagulation content of 0.1% or less by weight.

Appellants argue that, in Hofmann, the components for each stage are not present in a form emulsified in water.

In response, applicant's attention is drawn to examples of Hofmann, wherein SDOSS (sodium dioctyl sulfosuccinate, an emulsifier) and KPS (1%  $K_2S_2O_8$  in demineralized water) are added in each of the stages of polymerization to obtain a core-shell particle. Hence, it is the examiner's position that components in each stage, of Hofmann, are emulsified in water.

Appellants argue that, it does not appear from Takarabe et al that the reason for low coagulum content is the added presence of the film forming aid. There is nothing in the data to suggest any effect of the film-forming aid on a coagulate content.



In response, applicant's attention is drawn to Takarabe et al, wherein it states - object of the invention of Takarabe et al, is to provide a method by which a highly monodisperse emulsion polymer particles can be produced while the occurrence of coagulum or new particles is inhibited to a low level (col. 2, lines 30-36). The object is achieved, in Takarabe et al, by adding polymerizable monomer to an emulsion comprising seed polymer and thereafter polymerizing in the presence of a film forming aid (col. 2, lines 36-46). It is critical, in the process of Takarabe et al, that seed polymer is easy to plasticize by the film-forming aid (col. Col. 2, lines 51-53). Hence, it is clear that the film-forming aid plays a critical role in obtaining a monodisperse emulsion polymer particles while maintaining a low coagulum content.

Appellants argue that, there is no disclosure in Morningstar et al of a method of preparing a core/shell (meth)acrylate copolymer which is useful as an impact modifier that is produced under the desirable condition of having a low coagulate content.

In response, it is noted that Morningstar et al is used only for its teaching that addition of a long chain alkyl alcohol in the emulsifier system increases colloidal stability of the polymerization and reduces the amount of coagulum.

Appellants argue that, Falk does not disclose preparation of a core/shell copolymer which should have a low coagulate content.

In response, Falk is only used for its teaching that addition of styrene-acrylonitrile copolymer to acrylic core-shell copolymers reduces mold shrinkage and improves surface hardness. It is also noted that product claims (instant claims 29-38) only require

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a core-shell particle and not a process of preparing an aqueous dispersion, comprising core-shell copolymer, having a low coagulate content.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Karuna P Reddy/  
Examiner, Art Unit 1796

/Vasu Jagannathan/  
Supervisory Patent Examiner, Art Unit 1796

Conferees:

/Vasu Jagannathan/  
Supervisory Patent Examiner, Art Unit 1796

/Benjamin L. Utech/  
Primary Examiner